

AVIATION

The Oldest American Aeronautical Magazine

NOVEMBER 10, 1928

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XXV

Special Features

Dressing Up Aviation

Marking Our Airports and Airways

Air Mail and Transport in Australia

NUMBER
20

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The Oldest American Aeronautical Magazine

Vol. XXV

NOVEMBER 30, 1928

No. 20

WRIGHT

in 1903



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Air Races

THE value of air races and cross-country tours is almost universally admitted. These events attract the public, they help the sale of airplanes, and the competition undoubtedly helps to stimulate advance in airplane and engine design. If it is regarding the latter point about which there is the greatest amount of discussion when it comes to air races. Should races be limited to strictly stock designs which have formed the major portion of production over a considerable period of time, or should they represent the advance designs?

Intelligent effort has been applied to defining a stock model, but a question which really goes the matter serious consideration could draw up rules which would assure one that the planes and even the engines were the same as those which had been sold to the public during a specified period of time. The question is, whether this should be the case. Racing, which means high speed and high speed alone does not bring out all, or even the majority, of the qualities which make a good commercial plane. Too much emphasis on the racing of stock models might tend toward the developing of planes which would not possess the best commercial characteristics.

On the other hand there is real value in racing. The Pulitzer races undoubtedly have a far reaching effect upon the design of commercial planes, and engineers who have been trained to make the effort and carry this detail in relation to speed will undoubtedly build faster commercial planes than engineers who have never considered the element of speed. Racing also presents more opportunities for originality of design, as radically new ideas, which would not be incorporated in a design that was intended for immediate production, could be given a thorough test. Even if a plane may be a junk it may incorporate ideas which might be of real value if incorporated in a commercial plane. Finally, racing as such in a form of good will advertising which has a real value, and, in addition, it stimulates design progress. With the growing popularity of the industry many manufacturers and private individuals will find it worth while to develop special racing planes. Speed contests between such planes will be of real interest to the public and if certain restrictions are set on horsepower these planes will not be too expensive to build, and in the long run will prove to be of great value.

From the public standpoint closed course races of strictly commercial planes, or nearly commercial planes, are not very interesting. However, unless the planes are absolutely stock models, an exact duplicate of the manufacturer's production lines such races are not valuable to the industry. It is possible, of course, for manufacturers of standard production planes to obtain the speed which extra speed by using different wing sections, reducing the frontal area and using small wheels and different landing gears, etc. But it is not fair to consider the results as a commercial product or as a guide to the relative speed of the strictly stock job. If in competition between strictly

stock products that has a real value not only to designers but to future purchasers as well. As a matter of fact, airplanes should not be put upon speed alone. Much as the National Air Tour races have been criticized, these annual races bring out many characteristics of the competing planes. And if these races were applied to planes of similar size and general type they would be of real value. Significantly, for the sake of safety and fuel consumption tests might also be to the economic value of such meetings.

It would seem as if the obvious solution of the problems that have come to the front in regard to racing and other forms of competition would be to make a definite distinction between stock model competition and free-for-all speed contests. Such have their place and value, but are essentially different and therefore should be recognized as such. Public competition is one of the most effective methods of inspiring progress, and the difficulties encountered during the contests held this year should not be allowed to blind us to the economic value of such meetings.

Roman Roads

MOTORISTS who travel through Italy, France and England rarely stop to consider the fact that the roads over which they are passing were developed primarily for military purposes. Yet, the beginning of overland transportation, which opened up European markets was made possible by the network of highways which the conquering Roman armies had found necessary to construct and develop for military purposes.

Today the world moves even faster and we are already beginning to forget that automobiles, as we know it yesterday, was almost entirely the work of military forces, and that its primary purpose was war and not commerce. It has only been within the last two or three years that large civilian developments have taken place, but the influence of these military uprisings is quite noticeable even today. Some of the refinements are good, others are bad, but they will probably continue to exist for years.

An interesting example of the close relationship in the steady evolution of the Army and Navy's last aeronautical unit into the civilian field. In the matter of planning and the matter of engineering the military services are acting as educational institutions for the training of men who will be capable of taking their rightful place in civilian communities. When one considers the number of high class men who have left the engineering department at Wright Field in order to go into commercial aviation one wonders if there are any left to do the military work. At first glance the training of the military personnel would seem most harmful to the service, but as a matter of fact the personnel is steadily being transferred. The Army and Navy are receiving their insurance into the training of commercial aviation, and in the case of a national emergency the civilian industry will be full of men who have had military experience and are familiar with military requirements.

Air Mail and Transport in Australia

By MAJ. NORMAN BRUCELEY

Military Director, West Australian Airways, Ltd.

AIR mail and transport service in Australia is but seven years old. In those seven years, however, extremely rapid progress has been made. There are now three companies, operating plans of regular schedules over routes which cover a total of 4,800 mi. A census has been let by the Commonwealth Government for an additional 1,500 mi. air mail route to be opened in April, 1936, and negotiations are underway for still further expansion and development.

The growth of the "aerial mail," as we know it in Australia, may be attributed in part to the subsidies paid the contracting companies in several different states. On the other hand, the support of the public has more than warranted the present development. In some states, the air mail service has brought the first regular and frequent deliveries of mail. This is especially true of the small townships along the northwestern coast of Western Australia, where 40 per cent of the mail is now carried by air. Ordinary mail for the station of the country is transported by coastwise steamers, which are erratic and comparatively slow.

In 1925, West Australian Airways, Ltd., began the operation of the first air mail and transport line. This line extends from Perth, which is the southern terminus and is where the headquarters of the company are located, up the coast to Derby. Stops are made along the way at Geraldton, Carnarvon, Onslow, Roebourne, White Creek, Port Hedland and Broome. The airline distance of the entire route is 3455 mi. The trip is made normally in two



A side view of an Aero "drifter." Eight planes of this type are used by the flying club in Australia for training purposes.

and one-half days although it can be flown in 36 hr. An extension from Derby to Wyndham by way of Fitzroy Crossing and Hilda's Creek is proposed, which will increase the total mileage to 2,068.

The mail service offered by the Perth-Derby line was not particularly well patronized by the public during the



Side view of a 14-passenger DeHavilland "Hercules." On the new Perth-Adelaide route, planes of this type, equipped with three "Jupiter" engines, will be placed in service.

first year. The second year, however, a steady growth was noted in the number of letters carried, and at the close of 1932, the average had risen to 10,000 a month. Late in 1932, the monthly savings had increased to 15,000, while in the last six months of 1932 the average number of letters carried by plane was 20,000. Since that time, the use of the air mail has continued to increase. Correspondence from all parts of the world is carried regularly. The special aerial surcharge is therefore for every half ounce, in addition to the cost of regular postage. As a means of further speeding delivery, the Postal Department offers an express passenger delivery upon payment of an extra fee for each letter.

The passenger traffic on the line has been consistently good, in spite of the fact that the fares are from two to three times as great as those charged for steamer passage. Express traffic is growing, and the normal load during Perth seasons of automobile tires, engine and gearbox parts, mechanics, wearing apparel, sporting goods, and many other things that are required by the "outback" communities. It is not unusual for an automobile tire, costing several pounds, to pay more than its value in freight, but to save its owner several times its value as a result of the speed of delivery.

The township along the route, the distances between them, the passenger fares, and the parcel rates per pound are as follows:

Town	Distance	Fare	Parcel Rate
Perth to Carnarvon	530 mi.	£25 0s 0d	3s 0d
Perth to Onslow	770 mi.	£36 15s 0d	2s 6d
Perth to Roebourne	985 mi.	£43 0s 0d	3s 0d
Perth to Port Hedland	1035 mi.	£43 9s 0d	3s 0d
Perth to Broome	1345 mi.	£57 0s 0d	3s 0d

Town	Distance	Fare	Parcel Rate
Perth to Derby	1435 mi.	£28 0s 0d	3s 0d
Geraldton to Carnarvon	270 mi.	£10 10s 0d	3s 6d
Geraldton to Onslow	230 mi.	£15 15s 0d	2s 6d
Geraldton to Roebourne	275 mi.	£16 0s 0d	3s 0d
Geraldton to Port Hedland	275 mi.	£16 0s 0d	3s 0d
Broome to Broome	1965 mi.	£22 0s 0d	3s 0d
Geraldton to Derby	1765 mi.	£23 0s 0d	3s 0d
Carnarvon to Onslow	240 mi.	£4 5s 0d	3s 0d
Carnarvon to Roebourne	405 mi.	£10 10s 0d	2s 0d
Carnarvon to Port Hedland	405 mi.	£10 10s 0d	2s 0d

Onslow to Broome	575 mi.	£12 0s 0d	2s 6d
Onslow to Derby	685 mi.	£16 0s 0d	3s 6d
Roebourne to Port Hedland	100 mi.	£5 0s 0d	1s 0d
Roebourne to Broome	815 mi.	£12 10s 0d	2s 0d
Roebourne to Derby	510 mi.	£14 10s 0d	2s 6d
Port Hedland to Broome	510 mi.	£4 7s 0d	1s 0d
Port Hedland to Derby	430 mi.	£4 12s 0d	1s 0d
Broome to Derby	510 mi.	£4 2s 0d	1s 0d

In cases where the fact is less than 48 hrs., the baggage is made subject to cancellation if the accommodations are required by long distance passengers.

Excursion rates are provided, also. For example, the trip from Broome to Derby and return, the same day,

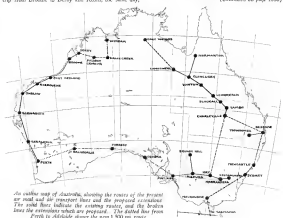
costs the passenger only 43 3s 0d. Going from Perth to Geraldton, or vice-versa, the excursion rate is £5 0s 0d. For a round trip, the full fare is charged for the forward journey, while there are reductions on the return fare if it exceeds £10. If the passenger returns within one week, there is a reduction of 50 per cent; within two weeks, 40 per cent; within three weeks, 30 per cent; within four weeks, 20 per cent, and within five weeks, 10 per cent. Each passenger is allowed 20 lb. of baggage. Excess baggage is charged for at the rate of one shilling per pound, if no other loading is rejected, and at two shillings a pound, if it becomes necessary to reject other loading.

Curry "C.O.D." Parcels

Parcels may be sent "value payable on delivery," or "C.O.D." from Perth to the northern townships. The ordinary freight rates are charged for unaccepting them, and in addition a commission is collected. For a parcel with a value of under one pound, the commission is one penny; for a parcel valued between one and two pounds, the commission is one shilling, threepence. Over a two pound valuation, the commission increases at a rate of threepence for every pound or fraction of a pound.

The rate of subsidy originally fixed by the government for the operation of the Perth-Derby line was four shillings a mile, but after three years of operation, the subsidy was lowered to three shillings, thenceforward a mile. Government auditors inspect the books regularly, and reductions of subsidy are fixed as a result. The contract with the government on this line is for a period of three years. The type of plane in use at the present time is the

(Continued on page 1556)



Marking Our Airports and Airways

By ARTHUR S. FORD

AMONG the many urgent problems awaiting the aviation engineer is that of establishing and maintaining communication between the airman and the terrain over which he passes.

Commercial aviation has developed so rapidly that the proper and adequate marking of airports, emergency landing fields, and air routes has necessarily lagged far behind the requirements. Outside of the skeleton equipment of the main mail routes and such local lighting and marking as may be provided at the various airports, America, today, is practically as unmarked and an unmarked country.

It is only necessary to consider for a moment the splendid and systematic marking of automobile routes throughout the entire country to understand what an enormous task awaits the aviation engineer in establishing and maintaining day and night signs to guide the aviator, and in providing means of continuous communication with him while he is on his way.

The automobilist, desiring to drive from New York to Portland, Me., need only follow the blazed trail marks, which appear on sign posts and traffic jacks placed every mile of his way, in order to reach his home with assurance and speed. It is seldom that he needs stop or slacken his speed for information, for it is spread broadcast along his path.

HWB Have Complete System Readily

It will be many years, of course, before the aviator can hope for so thorough a system of air signs, but it is just as obvious that such a system must eventually prevail, and it may be worth while now to try to formulate the basis, at least, on which such a comprehensive system could be built.

First, let us consider just what are the essential features of the problem of air marking, signaling and guidance. The motorist travels from town to town, and beyond identifying such towns as he enters or leaves it, naturally is obvious and simple matter, the only essential is to direct him from the town he is leaving to the town which is his next objective. As he proceeds on his intended route, other necessary and useful information is required to him by signs indicating dangerous hills, railway crossings, or other hazards that may confront him.

In the case of the aviator, when it comes to placing and guarding the path between two objectives, the conditions are entirely dissimilar to those of the motorist. Unlike the motorist, the aviator proceeds practically a box line from point to point. Thus, his course may depart from the straight line when regarded as a whole, but in essence the most direct flight resolves itself into a series of flights in as nearly a straight line as possible from one

point to another until the end of the journey is reached. The aviator, therefore, is not a pathfinder but a navigator, and if we should liken the aviator to a mariner, we can think of him as the captain of his ship, then we can more nearly recognize the kind of vessel and that he needs.

In the first case, it is obvious that the accuracy of his astronomical bearings is of prime importance, and the compass points of the plane he leaves, the course he flies, and the place he is directed to are essential. Now, while it is true that his plate is provided with the best-known scientific aids to his compass direction, yet experience has

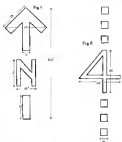


Fig. 1. A north pointer adapted as standard by the governmental authorities. Fig. 2. A route marker.

proved that the conditions obtaining in the air, under even the best conditions, render it far more difficult for accurate compass readings than on shipboard, and the presence of frequent and legible compass points on the ground is a recognized and obvious necessity.

Again, the markings of the trail itself must be afforded from the ground, and these trail or route markings, as far as possible, be as easily distinguished by night as by day and under conditions of poor visibility as well as in clear weather. There are many other essentials, however, in any thorough system of air marking. For instance,

there are the two important factors of identifying each locality by name and denoting in a simple and legible manner the distances and directions of other respective points. The problem of locating and identifying an airport tower, or route, is not as simple as it may at first seem. Any aviator who has viewed a 60 ft. road from a height of a few thousand feet will appreciate that any legend in letters of less than 20 ft. in size will be difficult to read at any altitude. Again, the largest letters cannot be read



Fig. 3. This illustrates an airport sign utilizing the best type letter blocks.

in the dark, in previous work it has been found that proper dimensions at night, and hence the cost of illumination becomes an important factor.

Outside of the purely governmental fields, airports are subject to the same requirements of any other business institution. They must operate at a profit, or they cannot be continued. For this reason, the interests of such business projects must heed the lesson that other business heads have learned from experience, one of the most important of which is that, however efficient and attractive their place of business may be, yet it is necessary to reach out in all directions to attract and lead the customer to their doors.

The name of an airport is the "sign over the door," and just as the country hotel or road house finds it profitable to letter and tell the country around it so being in trade so the greatest airport director will take steps to inform the aviator of its proximity several miles before it comes in view.

The question of mile posts and sign posts will naturally be ones for state and municipal authorities to give concern to, and this leaves us to the very important question of classification of signs and signals for the spreading of accurate wind, weather, and storm information to the aviator.

Sign and Signal Data Basic

The foregoing sign and signal data may be regarded as basic and necessary over every part of the country where there is flying, and the only remaining question to be considered in a general discussion is the provision of means for inter-communication between the ground and the aviator, which will give such other information and advice as may arise from time to time and which does not fall within the scope of the foregoing regular needs.

Reverting to the foregoing analysis of basic requirements, let us take them up in order and consider the best and most reasonable methods of imparting the necessary information to the aviator. First, let us consider the compass. Fig. 1 shows a north pointer adopted as standard by the governmental authorities. Here we have a broad arrowhead, the letter N, and a tall pole. It has shown in the sketch the standard dimensions of this device which measures 60 x 22 ft. over all. The compass does not specify any hard and fast rule as to its construction, its material, or its lighting mechanism, but does recommend that by day its color shall be chrome silver, as that has been found by experience to possess the

greatest visibility, inasmuch as it tends to fit the sign tones any conflict with its surroundings.

Again, the authorities recommend that this sign, as well as all other ground signs, shall be illuminated by a self-contained lighting device, rather than relying on the use of flood lights, which are more expensive to install and maintain.

Fig. 2 shows a section of route marking which indicates the path of route 4. It is obvious that this desired line can be given any desired extent to avoid confusion, just as the blue or yellow blue on a telegraph pole by the roadside guides the traveling motorist. The dotted line effect shown in Fig. 2 is obtained by the use of unit blocks designed to reflect the light around by day, and they are provided with red lighting by night. Advantages in taking of the roadway of images to run together when viewed from a distance, and these signs, therefore, are spaced apart as shown, thus saving installation cost and maintenance charges.

When it comes to providing means of locating the airport or town, the questions of the size of the letters, the method of lighting, and the cost of the latter item, all must be carefully considered. As before stated, any letters of less than 20 ft. in size must be repeated at least 25 ft. dimensions. This practically bars the use of banners, or other marks, as suitable places for the erection

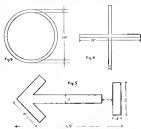


Fig. 4. A standard airport pointer. Fig. 5. A standard airport pointer. Fig. 6. This illustrates the accepted marking of an emergency field.

of indicating place letters. In Europe, airport signs are frequently placed upon the ground, and this course is far preferable to any other method.

Practically every airport has an available space either on its own grounds, or next to the field, where an adequate sign can be installed and operated. In construction, such a sign may be made of wood, or of metal, and the letters may be placed horizontally from any suitable material, and supported in any convenient manner. If it is desired, unit type letter blocks may be used, with their, any desired words can be spelled out by placing them on the black wooden box, just as children's building blocks can be arranged in any desired pattern.

In Fig. 3 is shown a unit letter sign made by this (Continued on page 1501)

The California Aircraft Operators' Association

By CHARLES F. McREYNOLDS

INDIVIDUAL operators of commercial aircraft throughout the country, for some time, have been consulting the problems of operation, those of cost finding, and those of determining the relative value of various types of ground and flying equipment, as well as the many other difficulties, which it is almost impossible for any one organization to solve unaided.

Particularly in Southern California, the need has been felt for some clearing house of information concerning operating problems. Thousands of persons have been flying in all types of airplanes and only away different routes, here in the southwest. Methods of operation, the fares charged and the equipment used have varied widely.

No one has been able to find just what insurance offers the best investment, just what types plans actually are the most profitable, and just what type and volume of advertising is the most productive at results. What is more, there has been no way of determining, for the good of the others, any special knowledge that certain groups of operators may have obtained.

Southern Business Aids

The situation finally became such that after much consideration by several of the leading operators, a meeting was held, and plans for the formation of an association were presented. When the actual organization meeting was called, 14 of the 47 operators in Southern California became charter members.

The California Aircraft Operators' Association, as the organization is known, was formed for the betterment of its members, as a means of increasing the size of its transportation, and for the development of an organization on the part of the public of many instances of aircraft safety and progress. The association will be incorporated as a non-profit, direct corporation. All schemes advanced and information gathered for the use of its members, will be available to them only.

Although the location of the 47 operators in Southern California are listed as charter members, the original 14 include many of the largest and most successful operators of commercial aircraft. Furthermore, there is every indication that within a very short time all other eligible operators will find that they cannot afford to remain out of the association. Southern California will thus be able to coordinate the views of the association, as representative of the aircraft operators, in all questions of legislation or public policy. Following the constitution of the Southern California fleet, it is hoped to immediately extend the organization to cover the entire state of California. Thereafter, the association can cope with all the problems of commercial flying.

It has with the attempt that is to be made to solve all the problems of aircraft operations, a paper on the com-

parative cost of operating various types of flying equipment will be read by one of the members at the organization's first meeting. Thereafter, members will be held every two weeks. A new problem will be discussed at each gathering. A monthly bulletin, containing statistics, operating data, and discussions of vital problems by technicians of the various operating companies will be published for the guidance of member operators.

It is felt by the operators, that this interchange of ideas will greatly expedite methods of aircraft operation, and will place flying on a real business basis. Certainly,



Flight picture of the Ryan cabin plane operated by Texas Pacific Coal and Oil Co. The plane is the product of the McKinney-Ryan Aircraft Corp., one of the charter members of the California operators' association.

the uniform treatment of certain problems and conditions, such as hours of flying, field equipment, pilot ratings, insurance, passenger accommodation, and so forth, will have a most beneficial effect upon the flying public. The operators intend to go further than the exchange of ideas and data on common problems. They have laid down plans for the establishment of a central bureau, which will centrally carry on business negotiations for the members.

Certain of the operators will plan, while others specialize in flying certain of one type or another. A review may not find what he wants if he approaches one operator only. He may be discouraged, because a plane is too expensive, or is not large enough, or because the course in flying is unsuitable to his needs, or the cost is beyond his purse. But anyone consulting the central bureau of the association will be given the opportunity to choose, for himself, that which is best suited to his needs. From the central office, of course, the customer will be referred to a certain member of the association.

(Continued on page 1514)

Dressing Up Aviation

A Discussion of Showmanship as Applied to Aircraft Operation and How it Will Increase Public Confidence

By DONALD KNIDE

Aeronautics Branch, Department of Commerce

SEVERAL years ago I stood at the rail of the Los Angeles to San Francisco night boat, "Harvard," watching preparations for departure. We were scheduled to shove off at 4 P. M. At 10 sec. to four o'clock, the gangway was stiff in place and two lines held the ship in the dock. A behind passenger could still have boarded the vessel.

At precisely 4 o'clock, an officer blew a whistle and a dozen things happened at once. The gangway was jerked free, the two holding lines cut off, the ship's engines were held speed steady, the wires reared a signal and three huge shipboard masts began to rock the stern and to mid-stem, and the ship's orchestra, situated on the promenade deck, began playing a lively air.

All this and several less striking incidents at the sound of the officer's whistle. A passenger dished up at sea would after four weeks not have been able to get aboard.

This was high class showmanship, of course. The ship might easily have been started under way without this rather amusing exhibition, but the effect of amusement would have been lost—and had amusement was completely unimpaired. Whenever I think of that trip, that "happy getaway" comes first in my mind.

There are many who will probably say that aviation is not far enough advanced to apply these methods to it, but the application of showmanship to aviation, particularly in its passenger service, could not but bring about a very favorable reaction and build up a much needed confidence in the mind of the American public.

A Good Example

Two years ago, an experimental airline and passenger service was started between Philadelphia and Washington, and later Norfolk, by the Philadelphia Rapid Transit Co., using three engined cabin planes. The planes were started in uniform, and the field attendants at each stop were instructed to perform their duties in a brisk, efficient, though courteous manner. Special landing platforms were built, onto which the planes were moved. Long poles were then swung out against the wheels so that unloading and disembarking passengers would be barred from the danger area near the propeller.

Embarking of passengers and loading of baggage was carried on as expeditiously as possible, and there was a business-like air about the operations that created confidence in the minds of the passengers and the onlookers.

The Philadelphia Rapid Transit later discontinued this line, which had inaugurated as an experiment during the Sesqui-Centennial, but it left a lesson, which some of the present air transport companies might well consider. A few have already adopted similar methods, but at any moment almost there is an apparent lack of system that does not inspire trust in the heart of the man who has never flown.

A business man who recently traveled over several



One of the Ford, three-engined, all-metal monoplanes operated by Mother Air Lines making a landing at the Long Beach, Calif., Municipal Airport. The headquarters of the California fleet are in Los Angeles.

airways in the United States told me of his impressions of the service at various points.

"At one airport I was waiting to take passage on a plane from ——— to ———," he said. "The plane was standing out in the field when I arrived, and two or three mechanics were tinkering with the engines. They may have been making only minor adjustments, but I recall hoping that they would not tarry through with any necessary repairs just to have the plane ready on time. Probably it did not occur to them, or to their operators' manager, but if they had desired to make a good impression they would have made those adjustments inside of a hangar, bringing out the plane only when it was ready to go."

"After a few minutes one of the mechanics climbed up into the pilot's compartment and permitted the other men to start the engines. It developed that he was the pilot. I decided that after seeing him in a leather jacket and put on a balance and goggles. I couldn't help feeling that I would have had a little more confidence, if he had come out of the flight office and taken his job like the captain of a ship walking onto the bridge of his vessel. That may seem far fetched, but things like that are important in building up confidence, and percentage of air passengers taken will not develop until that confidence has been built up."

"The plane was due to leave at a certain time, but when that moment came, the pilot was still warming up his engines. The passengers entered the cabin hurriedly, taking advantage of intervals when the engine on the engine side was idling. One or two had their hats blown off by not being quick enough. Another was almost thrown into a propeller. Someone shouted at him and stopped him in time, but he began the trip with a case of nervousness instead of being in a pleasant frame of mind."

(Continued on page 1516)

Airmaster Monoplanes

*Ohio Aero Mfg. Corp. Soon to Start Production on Two New Models
One Carrying Two and the Other Three Passengers*

PRODUCTION will be started in the near future by the Ohio Aero Manufacturing Corp., Youngstown, O., on two types of Airmaster cabin monoplanes having the same general dimensions but different power plants, seating capacities and weights. The first of these planes to be completed and test flown is known as the "Youngster" sport biplane, while the second is to be known as the Airmaster. Both are extremely lighted, high wing monoplanes of conventional design and construction.

The first Youngster is powered by an 80 hp. Anzani engine and gave evidence of noticeable maneuverability and speed in the test flights. With full load it attained a speed of more than 140 mph. and a landing speed of 42 mph. The service ceiling is 8,000 ft. The production power plant for this model, however, is to be the LeBlond five cylinder 60 hp. radial air-cooled engine. The Airmaster model is to be powered with the seven cylinder 90 hp. LeBlond engine. Two additional Youngsters and one Airmaster model are now nearly completed.

The Airmaster has a wing span of 32 ft. 9 in., an overall length of 22 ft. and a height in landing position of 7 ft. 1 in. The weight empty of the Youngster two place plane is 750 lb. and the gross weight 1,000 lb. The Airmaster, which is a three place plane, weighs 850 lb. empty and has a gross weight of 1,500 lb. While these figures are based on the planes powered with LeBlond engines, other new production power plants may be used without altering the main structure.

Airmaster planes are the result of three months of experimental work conducted by the company under the direction of Paul Velie, president, who has been experimenting with aircraft for the past seven years. Design features were checked by Dr. Alexander Klemin of the Duxet Guggenheim School of Aeronautics, New York.



A view of the wing fabrication department in the factory of Ohio Aero Manufacturing Corp., Youngstown, O.

University. The planes have been designed to meet the requirements of the individual airplane owner, the flying club and the executive who uses air travel extensively in business.

Stitch spruce is used in the wing structure and ribs of cross construction are nailed and glued to the spars. Compression ribs are built of steel tubing and dished wires are used in the internal wing bracing. The leading edge of the wing is reinforced with steel dunnage and is very light and rigid. The trailing edge is formed by a dural-aluminum.

(Continued on page 1508)



A front quarter view of the new "Youngster," two passenger cabin monoplane.

The Velie Model L-9

*Velie Motors Corp. Starts Production on a New Nine Cylinder Radial
Air Cooled Engine Developing 180 Hp. at 1900 R.P.M.*

PRODUCTION was started recently by the Velie Motors Corp., Moline, Ill., on its second aircraft engine, a nine cylinder, radial, air-cooled type developing 180 hp. at 1900 r.p.m. This engine is produced completely in the Velie factories and is especially designed for use in four place planes. About 100 lb. of block testing the first engines were installed in various planes, including the Travel Air and Monococh, the latter being a four-place cabin monoplane developed by Velie Aircraft, Inc., a subsidiary of Velie Motors Corp. The Monococh attained a high speed of 125 mph.

The L-9 is of conventional design, having five cast radial cylinders with all accessories and their drives in the rear. It develops 180 hp. at 1,800 r.p.m. and 180 hp. at 1,900 r.p.m. according to the manufacturer's specifications. The weight dry is 477 lb., which is 2.65 lb. per hp.* The overall diameter is 43 in. and the length 31 in.



A front quarter view of the new Velie, nine cylinder radial air cooled engine, which develops 180 hp.



Rear quarter view of the Velie L-9 showing the mounting of the Scabbie magneto and the Stromberg carburetor. The Velie starter is also shown.

electric starter is 43 in. The length without starter is 37 in. and the diameter of the mounting ring is 26 1/2 in. The fuel consumption is 35 lb. per hp. hr., or about 6.4 gal. per hp. hr. and the oil consumption is 1.05 lb. per hp. hr., or approximately 7 gal. per hp. A bore of 4 1/2 in. and a stroke of 4 1/2 in. gives a piston displacement of 694 cu. in. The compression ratio is 5.2.

*Based on standard metric.

The cylinder head is a Lyrite aluminum alloy casting with integral cooling fins and a dome shaped combustion chamber with two Cleveland spark plugs diagonally opposite, one in the front and one in the rear. Aluminum bronze valve seats are shrunk into the head for the tulip type intake and exhaust valves of high temperature resisting aluminum alloy steel, there being one intake and one exhaust valve per cylinder. Intake and exhaust ports as well as the manifolds are in the rear of the cylinders. Cooling fins on the top of the head between the ports and spark plugs are so placed as to be parallel with the displacement, while those on the sides are concentric with the axis of the cylinder. The head is shrunk and bolted to the radial cast cylinder.

Valve mechanism consists of the steel push rods and rocker arms with steel roller arms operating on two S R B roller bearings and provided with Alenite Zerk fittings for lubrication. The roller arms have roller followers in contact with valve stems. Push rods are housed in aluminum tubes and roller arms are supported by and enclosed in cast aluminum alloy boots each at radial to the cylinder head by three studs.

Short aluminum alloy Lyrite pistons are employed with ribs in the head running in both directions. The pistons

(Continued on page 1504)

THE BUYER'S LOG BOOK

Mesker Hangars

HANGARS OF standardized design, employing the "Downsman" steel and truss designed by George L. Mesker & Co., Evansville, Ind., are now being manufactured by the company. The firm also makes hangars and hangar structures to meet individual requirements. Whichever the structure is furnished, brick or the walls can be built and wood rafters and decking supplied in place of the steel siding or roofing. Ceilings can be placed on the beams of the trusses or insulation is simply hung.

The structural steel framework is designed according to the specifications of the American Institute of Steel Construction and conforms with the various state and municipal building codes.

Front quarter view of a Mesker hangar showing air-roofing, glazed doors and metal roofing and siding.

air-roofing used on these hangars is also a development of the company and consists of formed copper roof bearing sheets curved in radius to suit the slope of the roof. The steel channel purlins which support the roofing are spaced 4 ft. apart. Roll lips are made with packing slips to seal the joints. Interlocking galvanized steel siding with bands on corners at about 1 ft. and a stiff lip level is used in the construction. Erection is easily accomplished by attaching the siding to steel girders.

Two types of doors can be furnished for these hangars. One type is made to roll over the corner suspended from a heavy track. The doors have heavy steel frames with steel sash and glass in the upper portion and are filled with interlocking galvanized siding. They are hinged together in pairs. Bottom guides and bolts keep these in fixed position when closed. Large doors hang on self-aligning hangers to slide on a straight track in a position beyond the side of the building also can be furnished. The track is attached to the trusses with adjustable hangers to allow for the camber in the bottom chords of the trusses.

The company has been engaged in the manufacture of sheet metal building material and structural steel for a number of years.

Duplicate Safety Glass

COOPERATION BETWEEN the du Pont Vitrolite Co. and the Pittsburgh Glass Co. has resulted in the development of "Duplate" non shatterable safety glass and in the formation of the Pittsburgh Safety Glass Co., which is owned jointly by these two interests. The product is now being manufactured at the Coughlin Pl., plant of the Pittsburgh Glass Co. and distributed through the established sales organizations of the company. A higher rate of production will become effective as soon as the plant of the newly formed company at Coughlin is completed.

Duplate is made by combining two sheets of plate glass with one of Pyralis, the latter being placed between the

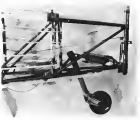
sheets of plate glass and the three layers being cemented together securely by means of special equipment and the application of heat and hydraulic pressure. A special safety of Pyralis is used in the process to obtain a finished product having the required clarity and other physical properties.

In the course of research to determine whether or not the product would withstand climatic and other conditions, exposure tests were conducted in many parts of the country as well as in the laboratories of the company where outside conditions were approximated by artificial means. In this manner the composition of the glass and Pyralis as well as the method used to cement them together were developed.

In order to keep the thickness of the finished product within practical limits, a process was developed making it possible to manufacture polished plate glass 3/8 in. or less in thickness. After careful consideration for defects two sheets of the thin plate glass are fused thoroughly and one surface of each is sprayed with the bonding material. A thoroughly fused sheet of Pyralis is then placed between the two and the heat and pressure are applied. The finished product does not exceed 9/16 in. in thickness.

Micarta Tail Wheels

WITH THE increasing use of brakes on airplanes, a number of manufacturers are fitting their planes with tail wheels instead of the familiar skids. A complete line of micarta tail wheels is included in the products of the



A Westinghouse Micarta tail wheel installed in the uncovered fuselage of a Ryan Broughman.

Westinghouse Electric and Manufacturing Co., East Pittsburgh, Pa.

is the cause of a series of land tests at the Westinghouse plant, one of these wheels was subjected to a normal pressure of 20,000 lb. on the axle before the hub gave way. The web of the wheel was unimpaired, the settling of the axle having caused the hub to fracture.

CP Pneumatic Riveter

RIVETING IN the manufacture of airplanes and light steel metal products can easily be handled by one man using the pneumatic riveter recently developed by the Chicago Pneumatic Tool Co., which has general offices at 6 East 44th St., New York and sales and service branches in many cities throughout the world. This tool is light, compact and helpful in speeding up production.

The pneumatic riveter is made in two sizes. The No. 1 CP, which weighs eight pounds, is suitable for use with steel rivets up to 3/8 in. in diameter down to 5/32 in. in diameter.



No. 2 CP pneumatic riveter with metal guard removed.

aluminum rivets to 3/16 in. in diameter. The No. 2 CP weighs 15 1/2 lb. and is designed for use with steel rivets up to 3/8 in., aluminum rivets to 5/16 in. and aluminum rivets to 3/16 in. A wide variety of interchangeable nozzles can be furnished to meet any requirement within the capacity of the machine. This feature not only saves time but permits the use of the same machine for a wide variety of work. Moving parts are completely covered by a metal guard.

Stanley Electric Drills

TEN PORTABLE drills are now included in the products of the Stanley Works, New Britain, Conn. The drills are well balanced and all parts are readily accessible for maintenance.

They are of various class ranging from 12 to 17 1/2 in. in length and weighing from 6 1/2 to 29 1/2 lb. The smallest, No. 141, has a capacity of 3/8 in. in steel and 3/4 in. in wood and the largest, No. 261, has a capacity of 3/4 in. in steel and 2 in. in wood. Six of the drills are made to operate on 120, 130, 150, 220 and 250 volts and the remaining four are not suitable for 22 volt system.

An ample supply of air for cooling is drawn into the frame at the rear of the drill by means of a fan mounted on the armature shaft. The air cools the brushes and commutator and by means of baffles passes between the armature and field winding and out through holes in the frame. Grease made of special alloy steel and are heat treated. They run in grease in ball-bearing and dust-proof housings. In all but one of the models the armature shaft is mounted on two ball bearings and radial ball thrust bearings are used in addition to long cone sleeves as the clutch shafts.

Three jaw clutches of the heavy duty type fitted to the ground grinder, are used on all the drills.

Electric Valve Refacer

A NEW electric valve refacer has been placed on the market by the Van Dusen Electric Tool Co., Cleveland, O. The device has a capacity for a wide range of valve sizes and angles and also can be used in sharpening cutters, grinding rocker arms and for other purposes. It has capacity of 5/16 in. to 3/8 in. valve stem diameters and a

universal head which can be set at any angle and lowered for quick adjustment to the more popular angles.

The motor is of the split phase, constant speed, high torque type and has an output of 3/4 hp. at 1750 r.p.m. The wheel head is designed in such a way that a split split the end of the shaft and is mounted in an adjustable housing, sealed from dust and automatically compensating for wear.

Standard equipment includes a cutter grinding attachment for 20 and 45 deg. cutters, a conical grinding dresser and vice block, dust pan, grinding wheel and double grip collet. A universal roller saw grinding attachment and a universal cutter grinding attachment for 15 deg. to 75 deg. cutters, can be furnished as extra equipment.

Whirlwind Parts Catalogue

THE REPLACEMENT parts for J-3 Whirlwind engines, stocked by the Whirlwind Aircraft Corp., Paterson, N. J., are now conveniently listed in a recently published catalogue which will be sent to interested owners on receipt of applications including serial numbers, by the company. The catalogue describes briefly the various parts and indicates those which are interchangeable. It also contains general information regarding the methods to be used in ordering parts.

Clum Switch

A COMBINATION lighting and ignition switch for airplanes is now being produced by the Clum Manufacturing Co., 435 National Ave., Milwaukee, Wis. The switch is designed for use on planes equipped with two magnets and turns all lights on or off at the same time. It is constructed of bakelite and phosphor bronze and designed to withstand vibration and weather conditions. The switch can be mounted on an instrument board by drilling a hole 2 1/8 in. in diameter.

Marking Our Airports and Airways

(Continued from page 1303)

method, and although the space between the units are very narrow, when seen close at hand, yet to the discern the letters stand out with great clarity as can be proved by holding the illustrations at arm's length and viewing the word from this distance.

Each airport should be marked by a clearance yellow circle at least 100 ft. in diameter as shown in Fig. 4. The band of the circle should be at least four feet in width and no lettering, or other device, should be placed within the circle, as it tends to produce confusion.

The approach to an airport should be marked in at least four directions, and in practice it is found that these markers should be within a five mile radius of the airport.

Fig. 5 shows the standard airport marker at the first class, and, of course, the additional information of the name of the airport can be added.

Fig. 6 shows the accepted marking of an emergency field, and Fig. 7 shows the emergency field marker which is distinguished from the first-class field marker by the cross instead of the bar in the sign.

For emergency airways, the anchor as shown in Fig. 8 is used, the location of same being indicated by the airplane exchange pointer as shown in Fig. 9.

The question of distances in miles is taken care of by the adoption of what is known as the "French card sys-

Packard

LAC-KARD CABLE IS CORONA PROOF

THE unusually severe service imposed upon ignition cable by modern high compression airplane engines demands a new type of cable—one that will withstand corona as well as oil fumes, moisture, and vibration.

Corona is a static electrical discharge present in all high tension systems. It releases free ozone from the air which attacks plain rubber insulated cable and very shortly impairs the dielectric strength of the insulation, resulting in a weak and delayed spark with consequent loss of power in the engine.

Packard Lac-kard Cable is the answer to this demand. The high quality rubber insulation in Packard Lac-kard Cable is protected by a stout braid which in turn is hermetically sealed by multiple coats of special pyroxylin lacquer. It is corona proof.

Write for samples and complete information

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tree" in which mile signs are placed in relation to the arrowhead, as shown in Fig. 10.

In this figure, the two blocks on each side of the arrow indicate that the objective to which the attention of the arrow is directed is 25 mi. away. This system eliminates the use of roman numerals which, in actual practice, have

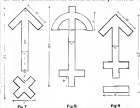


Fig. 7. An emergency landing aid, Fig. 8 shows a simple exchange marker, while Fig. 9 illustrates a simple exchange marker.

proved transmissibility, as numbers such as "25" and "50" tend to cause confusion when viewed under poor conditions of visibility.

As for as weather condition signs on the airport are concerned, the use of the wind indicator is required by the airport rating regulations, and such an indicator must be suitably illuminated at night. The words of weather indicating, however, will not long remain in this primitive state, as there are many other technological coefficients of rapid or greater importance to the aviator. The day is not far distant when every airport which aspires to a rating of first class will be required to equip and maintain a weather device under the direction of the central house, which will display the latest information as to the weather conditions in the surrounding country to the airport shown. This can conveniently be constructed in



Fig. 10. This shows a marker giving the distance to a certain point through the use of the "Packard system."

the form of an arrow of valispar size to be visible at a distance, and so disposed to the indicated compass points as to give warning of any threatened danger from any direction. For instance, this arrow may point to the southeast with a red colored arrow when excessive wind is expected from that point of the compass, and the color of the arrow may change with the nature of the threatened danger, as, for example, a green arrow may indicate snow and a blue arrow dust.

Again, the need of communicating with the airport is often urgent, and any convenient form of units may be



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Length	27 ft. 9 in.
Wing Load	12.50 lb./sq. ft.
Seating Capacity	8 Pass., 4 Pilots

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Landing Speed	41 m.p.h.

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Starter, Radio, Motor, Propeller, Compass, Air Speed Indicator, Navigation Lights, Instruments, Aluminum Clutch, Two Engines, Fuel, Oil, Propeller, and Oil Temperature Gauges, Air Gauge, Thermometer, and Fuel Valve, Exhaust Manifold, Cabin Heater.

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as disposed on the ground as to show by day and by night, the characteristic forms of the letters in the radio or telegraph code. With such a signal device under the control of a suitable contact mechanism in the control house, or the administration building, any desired message may be spelled out to the stream without necessitating his landing to receive it.

It will be obvious from the foregoing remarks that the whole question of runway marking and signaling is one worthy of the best thought of the engineer, and the director of an airport will find it profitable, as well as advisable, from an efficiency point of view to see that his field is equipped with the ultimate in signal and marking devices.

The Velie Model L-9

(Continued from page 1382)

are fitted with four $\frac{1}{8}$ in. Perfect Circle compression rings and one $\frac{1}{8}$ in. oil scraper ring. The piston pins are full floating bearing directly on the aluminum alloy of the piston head while operating in the loose bushing of the connecting rod. The single piece master rod is of the big end type with ball joint to provide a bearing for the crank pin. The eight articulated rods are connected to the wrist pins which are bronze bushed, all being carried to all bearings under pressure.

To permit assembly with the master rod a split type crosshead is used. It is of the single throw counterbalanced type and is made hollow throughout its length providing oil distribution. The propeller shaft is integral with the front or lead end which also includes the crank pin and is mounted on two S R B ball bearings, the forward one taking the thrust as well as the radial load.



The crankshaft assembly of the Velie L-9, showing the gear, con rings, bearings and propeller shaft

The crank pin is secured completely through the rear section and the two parts are held together by a bolt and two pins. The rear section is supported by another S R B ball bearing. The propeller hub, which is standard equipment, is located by means of a keyway in the tapered shaft.

Related to the crankcase, which is a one piece aluminum alloy casting, is a station that contains valve tappet guides, front main bearings and cam. A spur gear on the front section of the crankshaft drives the double track cam. The cam rings are one piece steel forgings with internal gears and are assembled on an aluminum alloy hub. Each cam ring has four lobes and runs at one-eighth engine speed.

As previously mentioned, all necessary drives are grouped at the rear of the engine and are readily accessible. The lubrication system includes one pressure pump and a double scavenger pump, so that the engine can be kept free of excess oil at all times. The pressure pump forces

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Aviation buildings will have to be built better and more substantially. Ask your insurance man. He will give you some rather startling information. Good hangars of brick and steel or all steel with Kinnear Hangar Doors will secure for you the lowest insurance rate.

Build a good hangar, equip it with the best and you will have taken care of everything in the first cost. There never was a better time for building good aviation buildings than right now. The cost of maintenance on cheap buildings poorly equipped is too great. Look to the future, compare the cost, and the figures will show that it is more economical to build a good hangar with good doors, than it is to build "something that will do," and land yourself with an unbalanced upkeep.

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THANK YOU for reading AVIATION

Airmaster Monoplanes

(Continued from page 1286)

men chosen. Two gasoline tanks, each having a capacity of 25 gal., are placed in the bays adjacent to the fuselage. Adapters are of welded steel tube construction, hinged to triple leaved air-brakes, and extend through approximately one-half of the span span. The entire structure is finished and covered with Grade A fabric sewed through the length of each rib. The wing is covered over the cabin to resemble the exterior appearance.

The Clark Y airfoil section is used in the wing and in the structure of the external wing struts, which are



A wing nearing completion in the shops of the Ohio Aero Manufacturing Corp., Youngstown, O.

fitted with Balsa wood and covered with fabric. This contributes to the lift of the wings. The rear strut on each side is adjustable.

As in the majority of new production planes the fuselage is constructed of welded steel tubing and is built in the form of a Warren truss. No wire bracing is employed in the fuselage structure, which, when completed, is faired with balsa, finished and covered with fabric.

Doors in each side of the fuselage afford access to the cabin, which is upholstered in a herringbone color and comfortably furnished. Window seats are provided and, in the Youngster model, passenger and pilot sit side by side. In the Airmaster model the pilot's seat is in the center of the cabin and in front of the two passengers' seats located on the after part of the cabin. Ample baggage space is provided and the side windows of shorter-proof planes are so designed that they can be opened and closed easily. Usually good visibility is provided from the pilot's position.

Instrument Panel Indirectly Lighted

All instruments required by the Department of Commerce are included in the panel, which is indirectly lighted and conveniently placed. While dual controls are not furnished as standard equipment, provision has been made for their installation in either model. The rodier is controlled by foot pedals and, like the other control surfaces, is actuated by extra flexible cable. The control system has been designed to afford unusual ease of manipulation and all vital parts may be reached by levers in the fabric covering. The wing is wired for navigation lights.

Landing gear is of the divided axle type and has a track of 7 ft. 3 in. Part of the landing load is transmitted



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This is one of the most solid and economical for winter use than could be had in the market. High grade materials of soft, durable, weather proof, warm, heavy lining of heavy fur with double-breasted, deep cape collar, cuffs, cuffs and other popular features. Made to order. Ready to ship at \$27.50.

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Wooly and in the nature of the material, weather-proof, and durable, weather proof, warm, heavy lining of heavy fur with double-breasted, deep cape collar, cuffs, cuffs and other popular features. Made to order. Ready to ship at \$27.50.

N-R Fur-lined (Two pieces) \$45.00 and \$50.00
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Airplane Company Inc.
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reader please did not lose a single detail of this, and more than one of those concerned to me on the admirable system. Believe me, things like that will certainly pay, for nowadays people are influenced greatly by all they see.

"You might tell them that the plane is modern, that its engine are safe, its mechanics skilled, and its pilot an expert, and they will probably believe you to some extent; but let them see the plane and finally up to the point where the managers are willing, its uniformed pilot insisting capability, and an air of business every where evident—and that is when you have sold something."

Of course, all transport companies have not reached the stage where they can place their pilots in uniform and spend money primarily to impress the public with their systematic operations, but there are many things which



A front quarter view of the new Stutz "Special Attractions," powered with a Wright "Whisper" engine.

can be done at little or no expense. Places certainly should be required and made ready for flight out of sight of the patron, and delays in taking off after the passengers are aboard should be completely eliminated. As the larger airports, waiting rooms should be made comfortable, so that passengers will be glad to remain longer until they are signalled to embark. In that way, they are kept away from noise, dust, and perhaps confusion in inclement weather, which are not serious, but might cause complaint.

When visitors at flying fields wish to witness operations, they should be assigned some particular spot, preferably a balcony from which they can observe flying without being so close that they interfere with the work. When there are miscellaneous operations such as passenger flights, short tours, etc., carried on at airports from which scheduled planes depart, these operations should be separated as much as possible. There will not be, of course, as much chance for appreciating these miscellaneous flights, although there is considerable room for improvement in this also.

It should be remembered that the first impression received by a visitor at an airport may make or lose a convert to aviation. This has already been recognized by air transport service, which is scheduled, and therefore the company should live up to all that the word "scheduled" implies.

"Dressing up aviation" applies quite as fully to the airplane itself. This has already been recognized by the manufacturers, many of whom have undertaken the refinement of their products, particularly the interiors of cabins. In the larger transport planes, comfortable adjustable or rotating chairs are used, and there are wide mesh windows, heaters and ventilators, reading lights and other furnishings, but there is still much to be done. Undoubtedly the needed improvement will be forthcoming as the wisdom of the country takes to the air. Women caused the refinement of the automobile and, as a result,

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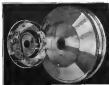
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which may be in excesses, or with any operators who contemplate forming such a group.

The formative period of the Southern California Association really has been passed. The heretofore problem of, perhaps, that of getting together many operators with widely varied interests and viewpoints, has been solved. The dues are nominal, so that they will not act as a deterrent in securing more members. By-laws, and legal problems in connection with dues, are being worked out by the executive committee with the advice of Major Taylor, the association's legal adviser.

The charter members are Aero Corporation of California; Ambassador Airways, Inc.; American Aircraft Co.; "Big" Blair, Dyer Airport; "Jim" Greiner, Earl Henderson, Modesto Air Lines, Inc.; Monterey-Egan Aircraft Corp.; "Eddie" Martin; Master Aircraft Co.; Rogers Aircraft; "Doc" Soles; and Short's Airport.

The officers are Robert Blair, president; Jack Pyle, of Aero Corporation of California, first vice-president; Howard Spence, of Ambassador Air Lines, second vice-president; Charles Dyer, secretary and treasurer; and Caden Jenkins, managing secretary.

Air Mail and Transport in Australia

(Continued from page 1481)

DE-30, which carries a pilot and four passengers. The planes are powered with Nimbus engines developing 350 hp, and have a maximum speed of 180 mph.

As a result of tenders called by the government last June, West Australian Airways secured the 1,500 mi. air mail route, which is to be opened in April. This line will extend from Perth across the continent to Adelaide. On this route, stops will be made at Kalbarra, Forrest and Ceduna. It is interesting to note, that with the opening of the new line and the proposed extension of the existing line in the northwest, Western Australia will have approximately 2,615 mi. of airways as compared with the existing 3,074 mi. of railroads.

On the Perth-Adelaide run, a mail load has been carried at a price of 12.88 per lb. The machines to be used on this route are DeHavilland "Hercules," equipped with three "Jupiter" engines. These planes have accommodations for 14 passengers, and develop a high speed of 130 mph. The new line will link up with English mail boats and will result in saving two days over the existing train time across the continent. The period of contract is five years, and the government is to provide all landing fields and night lighting equipment.

Always Has Paid Dividends

From a financial report, West Australian Airways has paid 10 per cent dividends regularly since it began operations, although actually it has operated upon the lowest rate of activity paid in Australia. A number of factors have contributed toward its success. No doubt, the exceptionally fine climatic conditions, the absence of mountain ranges, and the careful selection of personnel, resulting in sound maintenance of equipment, have all played their part.

Speaking of personnel, one pilot on a regular run has accumulated over 3,000 hr. in the air, and has never had more than a punctured tire as far as damage to his machine is concerned. What is it realized that this pilot has encountered forced landings and other difficulties, it is a considerable feat. Other pilots can be accredited with equally sound judgment, and such performances have greatly added to the growing public confidence. Plans

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THE "STARS AND STRIPES," Fairchild monoplane, powered with a Pratt and Whitney Wasp. An Eclipse Series XI Hand Inertia Starter is installed.



ILLUSTRATED AT RIGHT: Top, Eclipse Series VI Hand Inertia Starter, conventional type, particularly adapted to radial engines up to 1350 cubic inches. Bottom, Eclipse Series XI Hand Inertia Starter for radial engines up to 2500 cubic inches.

THE "FLOYD BENNETT," a Ford Tri-Motor, with a Wright Cyclone and two Wright Whirlwind engines. Each Whirlwind is equipped with the Eclipse Series VI Hand Inertia Starter, and the Cyclone with the Series XI Hand Inertia Starter.



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